AIR INTERFACE

11A, MULTI-ELEMENT
ADAPTIVE ARRAY

USER
EQUIPMENT

SS
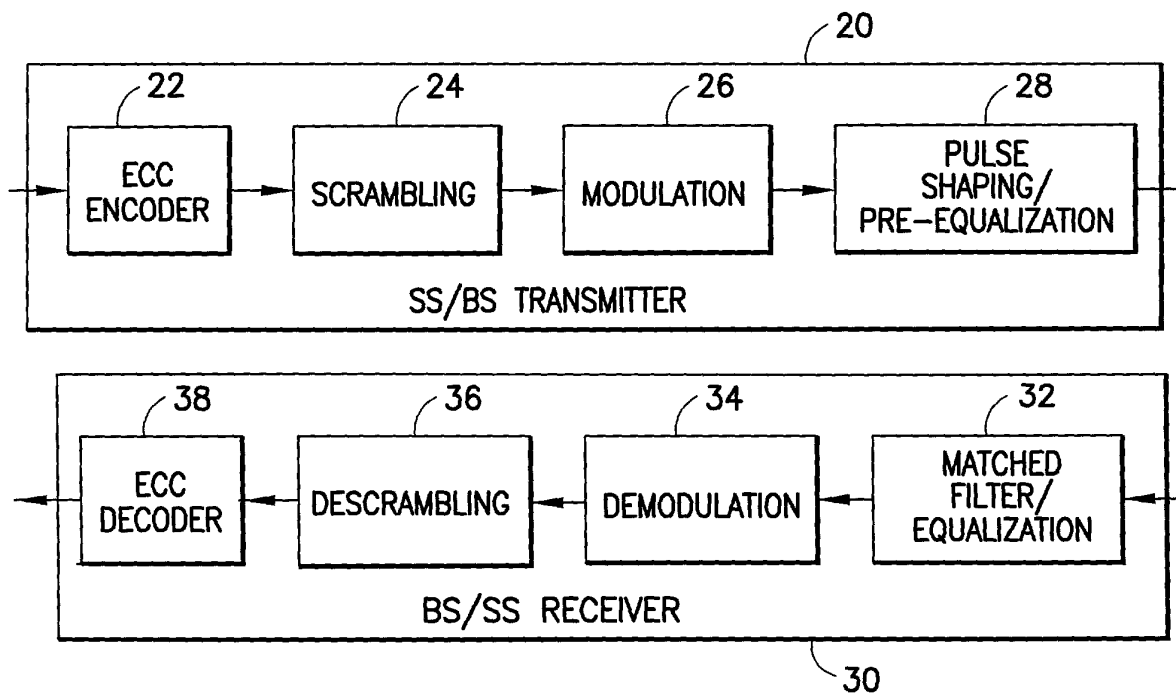
BS

CORE
NETWORK

12

10

REPEATER
(OPTIONAL)

11

14

16

FIG.1   WIRELESS ACCESS REFERENCE MODEL

20

| 22 | 24 | 26 | 28 |

ECC
ENCODER

SCRAMBLING

MODULATION

PULSE
SHAPING/
PRE-EQUALIZATION

SS/BS TRANSMITTER

38

36

34

32

ECC
DECODER

DESCRAMBLING

DEMODULATION

MATCHED
FILTER/
EQUALIZATION

BS/SS RECEIVER

30

FIG.2   PHY REFERENCE MODEL SHOWING DATA FLOW

22A

22B

24A

CC/TURBO
ENCODER

PUNCTURE
BLOCK

XOR

TO
MODULATOR 26

FIG.3

RANDOMIZING CODE
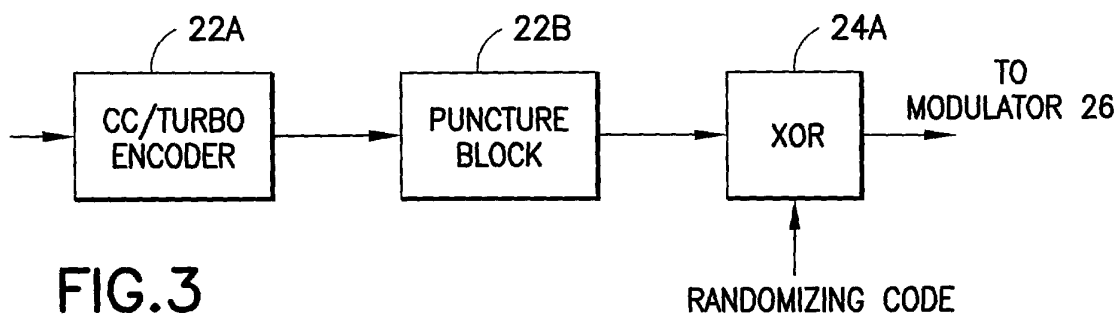
PARAMETER	MODULATION AND CHANNEL CODING		
	QPSK w/R=4/5 CODING (1.6 BITS/SYM)	16-QAM w/R=4/5 CODING (3.2 BITS/SYM)	64-QAM w/R=4/5 CODING (4.8 BITS/SYM)
RF CHANNEL BANDWIDTH	3.5 MHz	3.5 MHz	3.5 MHz
CHIP RATE	2.56 Mcps	2.56 Mcps	2.56 Mcps
COMMUNICATION CHANNEL BANDWIDTH	4.096 Mbps	8.192 Mbps	12.288 Mbps
PEAK DATA RATE	4.096 Mbps	8.192 Mbps	12.288 Mbps
CDMA CHANNEL BANDWIDTH (SF=1)	4.096 Mbps	8.192 Mbps	12.288 Mbps
CDMA CHANNEL BANDWIDTH (SF=16)	256 kbps	512 kbps	768 kbps
CDMA CHANNEL BANDWIDTH (SF=128)	32 kbps	64 kbps	96 kbps
MODULATION FACTOR	1.17 bps/Hz	2.34 bps/Hz	3.511 bps/Hz

FIG.4 HYPOTHETICAL PARAMETERS FOR A 3.5 MHz RF CHANNELIZATION

NUMBER OF ELEMENTS	QPSK		16 QAM		64 QAM	
	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR
1	4.096	1.17	8.192	2.34	12.288	3.511
2	8.192	2.34	16.384	4.68	24.576	7.022
4	16.384	4.68	32.768	9.36	49.152	14.044
8	32.768	9.36	65.536	18.72	98.304	28.088
16	65.536	18.72	131.072	37.44	196.608	56.176

FIG.5 AGGREGATE CAPACITY AND MODULATION FACTORS VERSUS MODULATION TYPE AND ARRAY SIZE
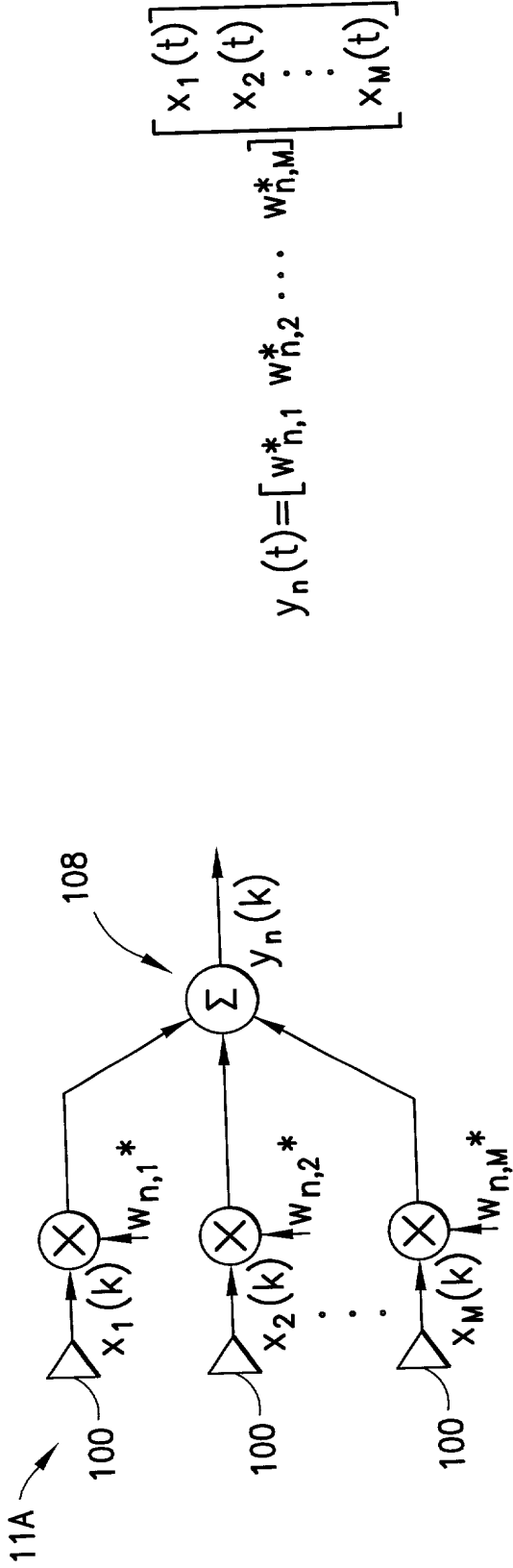
$$y_n(t) = \begin{bmatrix} w^*_{n,1} & w^*_{n,2} & \cdots & w^*_{n,M} \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \\ \vdots \\ x_M(t) \end{bmatrix}$$

FIG.6B

FIG.6A

TO DECISION DEVICE

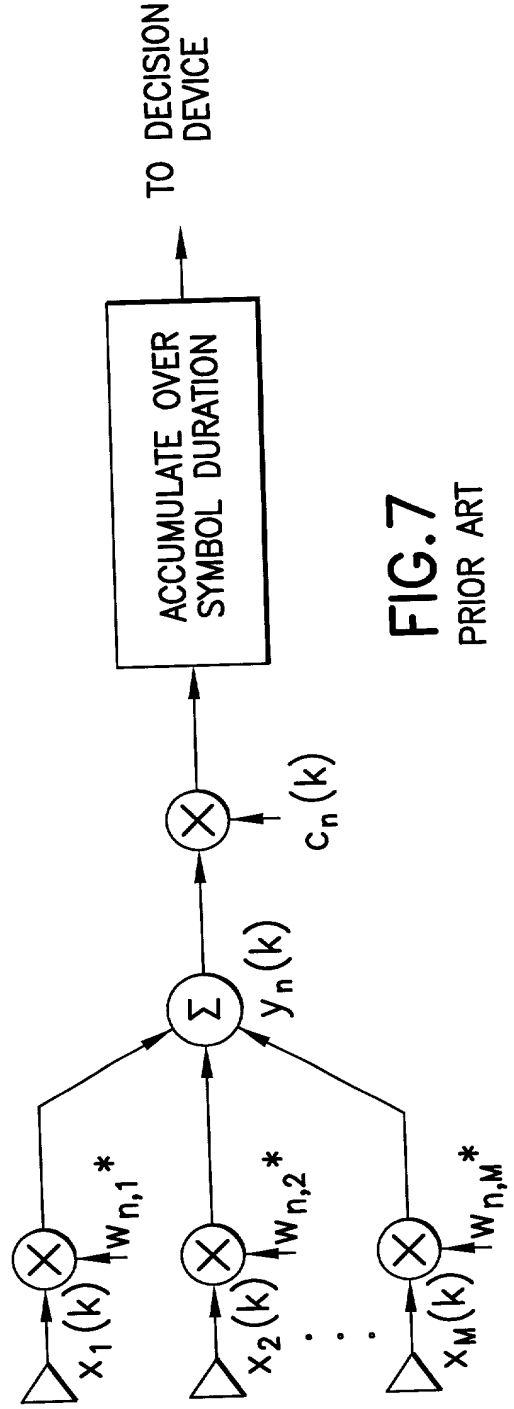ACCUMULATE OVER SYMBOL DURATION
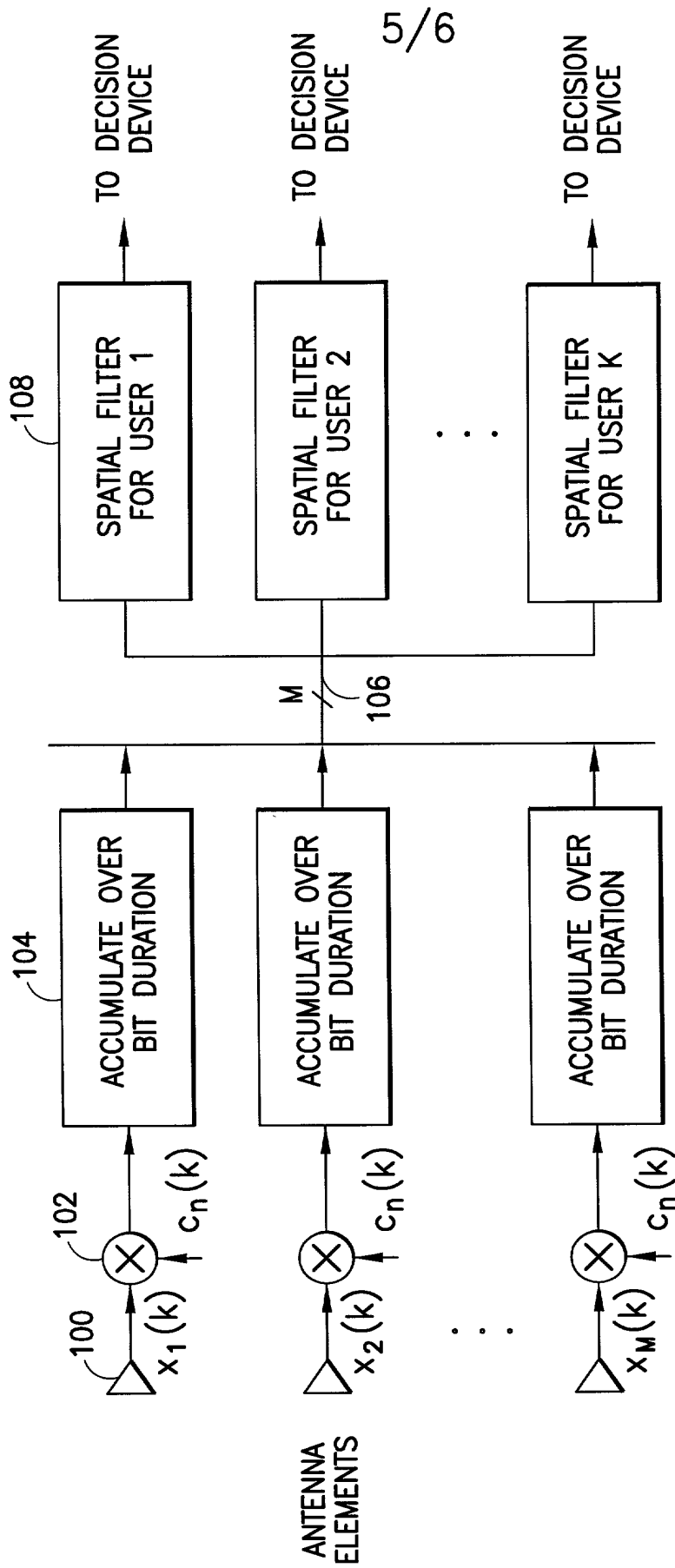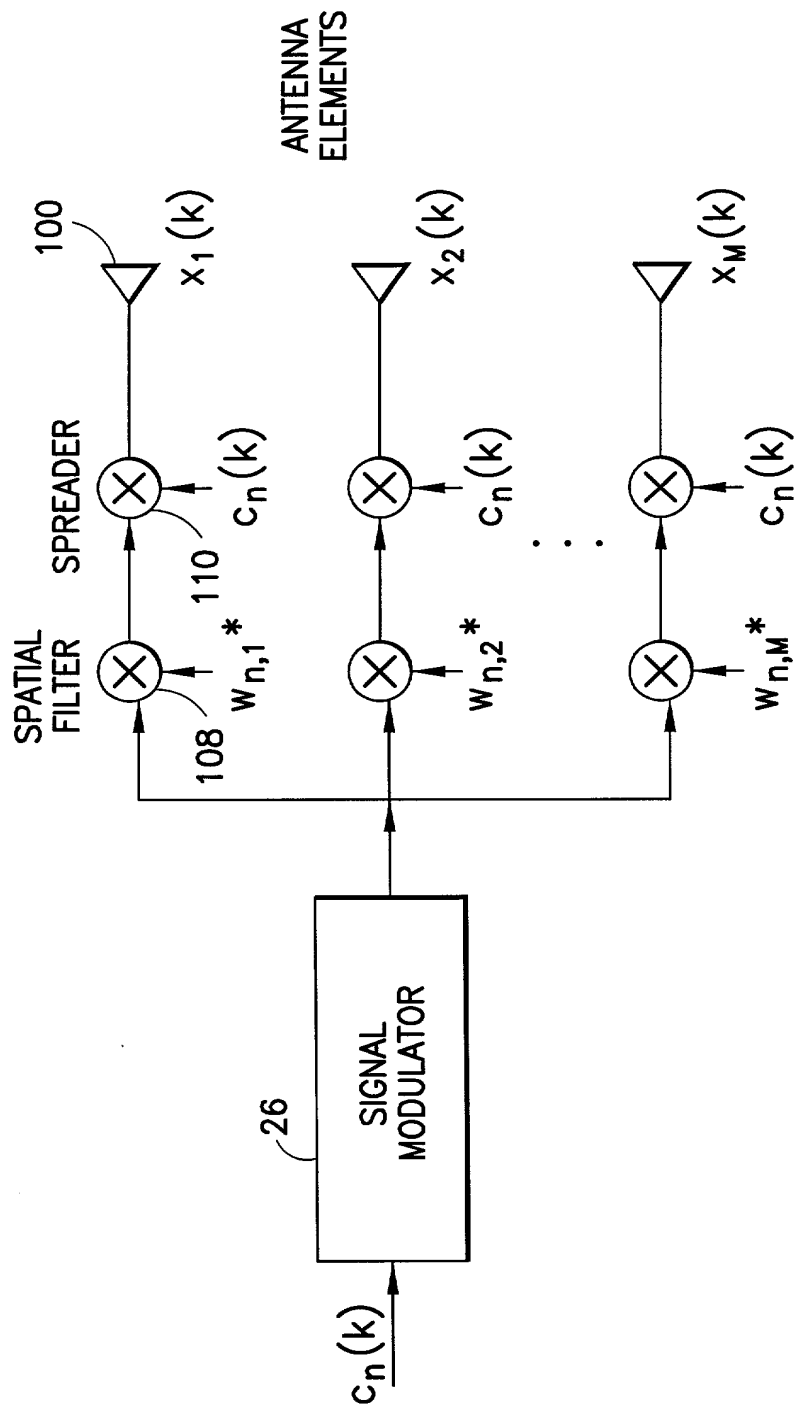
$c_n(k)$

FIG.7
PRIOR ART

FIG.8

ANTENNA
ELEMENTS

FIG.9

FIG.10

$$v = \begin{bmatrix} \alpha_1 \exp(j\phi_1) \\ \alpha_2 \exp(j\phi_2) \\ \vdots \\ \alpha_M \exp(j\phi_M) \end{bmatrix}$$